GPS Monitoring in Costa Rica and Modeling Crustal Deformation in the Caribbean Region

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The purpose of the Costa Rica GPS monitoring experiment (CORI) is to investigate earthquake and tectonic deformation in Costa Rica, which lies between the Middle America trench and the North Panama Deformed Belt (NPDB) and straddles the Caribbean plate - Panama Block boundary zone. The GPS network is concentrated in the region of the Nicoya Peninsula and along the Pacific and Caribbean coastal regions of Costa Rica. Both regions are undergoing strain associated with locked thrust faults. The Nicoya Peninsula lies adjacent a circum-Pacific seismic gap which has a high probability of a large (M > 7) earthquake in the next ten years [McCann et al., 1979; Nishenko, 1988; 1991]. In contrast the Caribbean coastal region south of Limon, Costa Rica was the site of a large (Mw 7.7) earthquake on April 22, 1991, with co-seismic displacements measured using GPS [Lundgren at al., *GRL*, 1993] and therefore would be considered to be at the beginning of a presumably longer repeat time based on the slower convergence rate at the NPDB. The GPS network contains 24 sites measured in 1994 with additional permanent sites presently being established. One permanent site is currently running with a second site to be operational by early 1996.

GPS displacements in a plate margin location such as Costa Rica necessarily measure a superposition of deformation signatures, interseismic strain above the subduction zone, far-field plate motions, and deformation within the plate margin. To understand any of these physical processes we must separate the affects each has on the GPS displacements. We present some ongoing work using GPS and geologic constraints in a finite element solution on a sphere to understand plate margin displacements in the Caribbean, Central America and northern Andes region.